

1. INTRODUCTION

Jacques Whitford Limited (Jacques Whitford) was contracted by Toronto Public Health (TPH) to conduct a Biosolids Pellet Review Study. To this end Jacques Whitford has conducted a Human Health and Ecological Risk Assessment (HHERA) for various application scenarios of biosolids pellets (pellets) produced up until 2003 by the Ashbridges Bay Treatment Plant (ABTP) in the City of Toronto.

The initial contract and scope of work awarded to Jacques Whitford included a review and risk assessment of the land application of biosolids cake product produced at the ABTP and spread on nearby agricultural land. During December 2003, the focus of the project was altered by TPH to include only a review and HHERA on the application of pellets, formerly produced at ABTP, to be spread within the borders of the City of Toronto. The revised scope of work limited the number of entities of potential concern (EoPC) evaluated in the study.

This report provides a background on pellets produced at ABTP, the regulatory context involved with the spreading of pellets, data analysis of the EoPCs, available concentration data in ABTP biosolids cake and pellets, a human health risk assessment, an ecological risk assessment, discussion of emerging issues surrounding pellets, and recommendations on appropriate pellet uses.

1.1 Study Background

The application of biosolids on agricultural land and other types of land is a common biosolids management practice employed by municipalities in Ontario and across North America.

Conventional sewage treatment consists of a combination of physical, chemical and biological processes that separate solids from water in sewage. The solids are typically digested in an anaerobic digester resulting in stable organic matter. The solids remaining after the digestion process are further dewatered or processed, producing biosolids cake. Pellets are produced by further heating and dewatering of biosolids cake. Biosolids cake or pellets may be landfilled, incinerated or land applied.



In 1998, the City of Toronto decided to pursue a policy of 100% beneficial use of biosolids at Ashbridges Bay Treatment Plant (ABTP). A pelletization plant was constructed at the ABTP to convert 50% of the plant's biosolids into dry pellets, leaving 50% as dewatered cake. Both forms of biosolids could then be applied to land. The high nutrient and organic carbon content of biosolids makes them a potentially valuable resource as a fertilizer for land application. Land application of biosolids cake is regulated in Ontario through Regulation 347 of the Environmental Protection Act and the Ontario Ministry of Environment's (MOE, 1996a) *Guidelines for the Utilization of Biosolids and Other Wastes on Agricultural Land* (although biosolid pellets are essentially the same material as biosolid cakes, in terms of metal content and other contaminants). Regulation 347 exempts wastes that are sold; therefore, the City of Toronto pellets would then fall under the jurisdiction of the Federal Fertilizers Act.

Although biosolids are a potentially valuable resource, considerable public concern remains over their use. Public apprehension surrounding the levels of environmental contaminants (metals, organic compounds, pharmaceuticals, *etc.*) and pathogenic content of biosolids has led to concern that the spreading of biosolids may adversely impact both human and ecological health. The long-term application of pellets on land may also lead to accumulation of entities of potential concern (EoPCs) in soils.

Although the pelletizer plant was recently damaged in a fire at the ABTP, our understanding is that the plant will be repaired. It has been assumed that the quality of pellets produced by the new or refurbished plant will not differ significantly from what was previously produced.

1.2 Objectives

The focus of this study is on the use of pellets produced at Ashbridges Bay Treatment Plant (ABTP) as fertilizer within the City of Toronto limits or on City of Toronto owned lands. Pellets were considered to be used under three scenarios:

1. Use of pellets as a fertilizer on City of Toronto owned land (*e.g.* parks, golf courses).
2. Commercial sale of pellets to residents of the City of Toronto for application on their home lawns and gardens as a fertilizer.
3. Use of pellets as part of a landfill topdressing mixture applied as cover material by the City of Toronto. Topdressing is a material applied on top of soil without mixing it in.



The overall objectives of the study are to:

- Improve knowledge and understanding about biosolids pellets and related issues;
- Provide information to assist in developing appropriate management practices for pellet use in the City of Toronto; and,
- Provide practical and scientifically defensible information to address public concerns related to pellets.

1.3 Scope of Work

This study examines both chemical and biological hazards associated with the use of pellets on City of Toronto land within the relevant regulatory framework in Ontario and Canada. Chemical hazards, or EoPCs, were selected based on low volatility, persistence in the environment and, to a lesser extent, availability of analytical data. The study addresses only issues relevant to pellets formerly produced by the Ashbridges Bay Treatment Plant and their potential application on lands within the City of Toronto or on City of Toronto lands and potential impact on human and ecological health. The study does not address the use of pellets on agricultural lands, nor does the study address the land application of biosolids cake.

1.4 Organization of This Report

This report is presented in eleven sections:

Section 1 describes the study background, objectives, and scope of work.

Section 2 presents the approach to human health and ecological risk assessment in this study.

Section 3 provides background information on the City of Toronto Ashbridges Bay Treatment Plant (ABTP), biosolids characteristics and regulatory frameworks that govern biosolids management.

Section 4 provides a review of EoPC concentrations in pellets and cake produced at ABTP and provides the rationale for selection of EoPC concentrations to be used in the quantitative risk assessment.



Section 5 presents the results of the human health risk assessment.

Section 6 presents an overview of human health risks from biological agents.

Section 7 presents the results of the ecological risk assessment.

Section 8 presents a discussion on the emerging issues surrounding biosolids pellets.

Section 9 provides a summary of the results and conclusions of the assessment.

Section 10 contains a statement of limitations and closure for this assessment.

Section 11 provides a list of references.

Finally, supporting information is provided in appendices at the end of the report.

